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Synthesis of silver nanoparticles in dielectric matrix by ion implantation: A review

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Abstract

Results on ion-synthesis and optical absorption properties of silver nanoparticles in various dielectrics are reviewed. Composites prepared by the low energy ion implantation are characterized by the growth of metal particles with a size distribution in the depth from the irradiated substrate surface. Such structures lead to specific optical properties of implanted materials, partially to difference in reflection measured form implanted and rear face of samples. The unusual optical absorption of silver nanoparticles fabricated in polymer is also considered. Weak and broad plasmon resonance spectra of the silver nanoparticles are explained in the frame of the carbonization of ion-irradiated polymer. The practical recommendations for fabrication composites with implanted metal nanoparticles for optoelectronics are discussed.